

outcome. There was increasing agreement that these tests, and especially the one-stage test of Quick, do not specifically measure prothrombin but are also influenced by other variable factors. The test might better be called an "accelerated coagulation" test. Extensive clinical experience has shown, however, that the test is an extremely useful and usually reliable practical means of controlling the dosage of dicumarol.

The book is not intended for the uninitiated. Those who are working along these lines or who have a fair general knowledge of the subject will find it a convenient source of valuable new information.

P. W. CLOUGH



THE PHYSIOLOGY AND PATHOLOGY OF EXPOSURE TO STRESS. *A Treatise Based on the Concepts of the General-Adaptation-Syndrome and the Diseases of Adaptation.*

By Hans Selye. *Acta, Montreal, Canada.* xx + 822 pp. + 203 pp. references; ill. 1950.

This volume is a detailed presentation of Selye's theory of the influence of stress on physiological and pathological processes. The outline of the theory is simple. Agents which derange the normal function of a large number of body cells produce stress reactions in the organism (e.g., burns, strong drugs, temperature extremes, emotion, infection). While these agents may have diverse specific and local effects in the body, they also produce in common general *non-specific, systemic reactions*. These reactions are attempts of the organism to adapt to stress, or are the byproducts of such attempts. For this reason Selye calls this pattern of reactions the *general adaptation syndrome* (G.A.S.).

The G.A.S. is divided into three stages. First is the *alarm reaction* in which the organism is in a state of shock. Its body temperature falls, blood sugar rises and then falls, the adrenal and pituitary glands are overactive, and the nervous system is depressed. Most of these changes reverse themselves in a countershock reaction, which develops into the second stage, that called the *stage of resistance*. In this, the organism develops an increased resistance to the specific stressful agent, but decreases its resistance to all other kinds of stress. Finally, there is the *stage of exhaustion*, which occurs if the organism is exposed to prolonged stress. Resistance to the stressful agent collapses, and the symptoms of the alarm reaction return.

In some cases, non-specific resistance is developed such that the body can withstand other stresses than the one to which it has adapted. Regardless of successful resistance, however, the organism pays for adaptation and may develop what Selye calls *diseases of adaptation* (e.g., adrenal tumors, vascular lesions, gastrointestinal erosions, rheumatism, arthritis, various psychosomatic disorders, etc.).

Selye reviews a vast amount of literature to present and support his theory (about 6000 references). He draws from human clinical material, but leans most heavily on studies of stress in experimental animals. His primary aim is to use his theory to suggest mechanisms for various cases of adaptation and for the genesis of diseases of adaptation. In doing this, he gives central place to the hypothalamus and the hypophysis as the integrators of defense against stress. These centers, operating largely through the adrenal cortical system, are also responsible for the organ changes seen in the diseases of adaptation.

Selye is speculative, but he is also scholarly. He has made a bold attempt to bring together, in one theory, many previously unrelated medical and physiological facts. He recognizes his hypotheses as tentative, but uses them to build a logical groundwork for the study of stress.

ELIOT STELLAR



BIOLOGICAL STUDIES WITH POLONIUM, RADIUM, AND PLUTONIUM. *National Nuclear Energy Series, Manhattan Project Technical Section, Division VI, Vol. 3.*

Edited by Robert M. Fink. *McGraw-Hill Book Co., New York, Toronto, and London.* \$3.75. xvi + 411 pp.; ill. 1950.

In the Editor's Preface, it is stated that this book is based on some ten Progress Reports, Technical Papers, and Articles describing researches carried out by the Division of Radiobiology at the University of Rochester under contract to the Manhattan Project and the Atomic Energy Commission. This material has been edited so that the proper coherence and integration into book form could be achieved. Despite this editing, the volume, which deals with the distribution, retention, and excretion of polonium, radium, and plutonium in a number of rats and a few humans (leukemics), suffers from overwriting. There is a tedious preoccupation with minor details (e.g., how to make intravenous injections into a rat's tail) and uncritical presentation of enormous amounts of data of no particular significance. Here and there many useful experimental procedures are described, but the reader is required to wade through a morass of tabular and clinical material to find them. The sections on plutonium and radium offer little that is new to physiologists versed in the older literature. The section on plutonium can have only a morbid kind of interest to most radiobiologists because the material required to repeat the experiments described and to elaborate them further is inaccessible to all but those workers employed by the A.E.C. or contractors.

Little of this criticism is intended for the brave and devoted band which did the work. The trouble can best be analyzed by a consideration of the fascinating